

CLAIMS

- (Continued)
1. A fuel cell apparatus for use with a host device having a processor and a processor link, the fuel cell apparatus comprising:
- 5 a fuel reservoir;
an information storage device; and
an information storage device link, operably connected to the information storage device, configured to operably connect the information storage device to the processor link.
- 10 2. A fuel cell apparatus as claimed in claim 1, further comprising:
a bi-product reservoir.
- 15 3. A fuel cell apparatus as claimed in claim 1, further comprising:
a fluid connector configured to releasably connect the fuel reservoir to a fluid connector in the host device.
- 20 4. A fuel cell apparatus as claimed in claim 1, further comprising:
a housing enclosing the fuel reservoir; and
at least one fuel cell, located at least partially within the housing, connected to the fuel reservoir.
- 25 5. A fuel cell apparatus as claimed in claim 4, wherein the at least one fuel cell comprises a fuel cell stack.
6. A fuel cell apparatus as claimed in claim 4, wherein the at least one fuel cell comprises a PEM fuel cell.
- 30 7. A fuel cell apparatus as claimed in claim 4, further comprising:
a power contact, operably connected to the at least one fuel cell, configured to electrically connect the fuel cell to the host device.

8. A fuel cell apparatus as claimed in claim 1, wherein the information storage device link comprises an electrical connector.

5 9. A fuel cell apparatus as claimed in claim 1, wherein the information storage device link comprises a non-contact link.

10. A fuel cell apparatus as claimed in claim 1, wherein the information storage device comprises non-volatile memory.

10 11. A fuel cell apparatus as claimed in claim 1, wherein the information storage device defines a data structure and stores data indicative of the data structure.

15 12. A fuel cell apparatus as claimed in claim 1, wherein the information storage device stores data that is used by the host device to determine whether the fuel cell apparatus is acceptable for use with the host device.

20 13. A fuel cell apparatus as claimed in claim 1, wherein the information storage device stores data that represents at least one of an initial fuel level, a current fuel level, and a low fuel warning threshold.

14. A fuel cell apparatus as claimed in claim 1, wherein the information storage device stores data that represents current fuel level in a decrementable data field.

25 15. A fuel cell apparatus as claimed in claim 1, wherein the information storage device stores data that represents non-operative information.

16. A fuel cell apparatus as claimed in claim 1, wherein the information storage device stores data that will trigger a predetermined host device function.

30 17. A fuel cell apparatus as claimed in claim 16, wherein host device includes a display and the predetermined host function comprises a displaying a message on the display corresponding to data stored in the information storage device.

18. A replaceable fuel cartridge for use with a host device including a processor, a processor link and a power generation device, the fuel cartridge comprising:

a cartridge housing;

5 a fuel reservoir within the cartridge housing;

a connector that connects the fuel reservoir to the power generation device when the fuel cartridge is received by the host device;

an information storage device carried by the housing; and

10 an information storage device link, operably connected to the information storage device and carried by the housing, configured to operably connect the information storage device to the processor link when the fuel cartridge is received by the host device.

19. A replaceable fuel cartridge as claimed in claim 18, further comprising:

a bi-product reservoir within the cartridge housing;

15 a connector that connects the bi-product reservoir to the power generation device when the fuel cartridge is received by the host device.

20. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device link comprises an electrical connector.

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21. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device link comprises a non-contact link.

22. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device comprises non-volatile memory.

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23. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device defines a data structure and stores data indicative of the data structure.

30 24. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device stores data that is used by the host device to determine whether the fuel cartridge is acceptable for use with the host device.

25. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device stores data that represents at least one of an initial fuel level, a current fuel level, and a low fuel warning threshold.

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26. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device stores data that represents current fuel level in a decrementable data field.

27. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device stores data that represents non-operative information.

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28. A replaceable fuel cartridge as claimed in claim 18, wherein the information storage device stores data that will trigger a predetermined host device function.

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29. A replaceable fuel cartridge as claimed in claim 28, wherein host device includes a display and the predetermined host function comprises a displaying a message on the display corresponding to data stored in the information storage device.

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30. A replaceable fuel cell device for use with a host device having a processor, a processor link and at least one host power contact, the fuel cell device comprising:

a fuel reservoir;

at least one fuel cell operably connected to the reservoir;

at least one fuel cell power contact configured to be operably connected to the at least one host power contact when the fuel cell device is received by the host device;

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an information storage device; and

an information storage device link, operably connected to the information storage device, configured to operably connect the information storage device to the processor link when the fuel cell device is received by the host device.

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31. A fuel cell device as claimed in claim 30, further comprising:

a bi-product reservoir operably connected to the at least one fuel cell.

32. A fuel cell device as claimed in claim 30, wherein the at least one fuel cell comprises a fuel cell stack.

5 33. A fuel cell device as claimed in claim 30, wherein the at least one fuel cell comprises a PEM fuel cell.

34. A fuel cell device as claimed in claim 30, wherein the information storage device link comprises an electrical connector.

10 35. A fuel cell device as claimed in claim 30, wherein the information storage device link comprises a non-contact link.

36. A fuel cell device as claimed in claim 30, wherein the information storage device comprises non-volatile memory.

15 37. A fuel cell device as claimed in claim 30, wherein the information storage device defines a data structure and stores data indicative of the data structure.

20 38. A fuel cell device as claimed in claim 30, wherein the information storage device stores data that is used by the host device to determine whether the fuel cell device is acceptable for use with the host device.

25 39. A fuel cell device as claimed in claim 30, wherein the information storage device stores data that represents at least one of an initial fuel level, a current fuel level, and a low fuel warning threshold.

40. A fuel cell device as claimed in claim 30, wherein the information storage device stores data that represents current fuel level in a decrementable data field.

30 41. A fuel cell device as claimed in claim 30, wherein the information storage device stores data that represents non-operative information.

no	country	year	value	unit
1	USA	1990	1000000000000	kg
2	USA	1991	1000000000000	kg
3	USA	1992	1000000000000	kg
4	USA	1993	1000000000000	kg
5	USA	1994	1000000000000	kg
6	USA	1995	1000000000000	kg
7	USA	1996	1000000000000	kg
8	USA	1997	1000000000000	kg
9	USA	1998	1000000000000	kg
10	USA	1999	1000000000000	kg
11	USA	2000	1000000000000	kg
12	USA	2001	1000000000000	kg
13	USA	2002	1000000000000	kg
14	USA	2003	1000000000000	kg
15	USA	2004	1000000000000	kg
16	USA	2005	1000000000000	kg
17	USA	2006	1000000000000	kg
18	USA	2007	1000000000000	kg
19	USA	2008	1000000000000	kg
20	USA	2009	1000000000000	kg
21	USA	2010	1000000000000	kg
22	USA	2011	1000000000000	kg
23	USA	2012	1000000000000	kg
24	USA	2013	1000000000000	kg
25	USA	2014	1000000000000	kg
26	USA	2015	1000000000000	kg
27	USA	2016	1000000000000	kg
28	USA	2017	1000000000000	kg
29	USA	2018	1000000000000	kg
30	USA	2019	1000000000000	kg
31	USA	2020	1000000000000	kg
32	USA	2021	1000000000000	kg
33	USA	2022	1000000000000	kg
34	USA	2023	1000000000000	kg
35	USA	2024	1000000000000	kg
36	USA	2025	1000000000000	kg
37	USA	2026	1000000000000	kg
38	USA	2027	1000000000000	kg
39	USA	2028	1000000000000	kg
40	USA	2029	1000000000000	kg
41	USA	2030	1000000000000	kg
42	USA	2031	1000000000000	kg
43	USA	2032	1000000000000	kg
44	USA	2033	1000000000000	kg
45	USA	2034	1000000000000	kg
46	USA	2035	1000000000000	kg
47	USA	2036	1000000000000	kg
48	USA	2037	1000000000000	kg
49	USA	2038	1000000000000	kg
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52	USA	2041	1000000000000	kg
53	USA	2042	1000000000000	kg
54	USA	2043	1000000000000	kg
55	USA	2044	1000000000000	kg
56	USA	2045	1000000000000	kg
57	USA	2046	1000000000000	kg
58	USA	2047	1000000000000	kg
59	USA	2048	1000000000000	kg
60	USA	2049	1000000000000	kg
61	USA	2050	1000000000000	kg
62	USA	2051	1000000000000	kg
63	USA	2052	1000000000000	kg
64	USA	2053	1000000000000	kg
65	USA	2054	1000000000000	kg
66	USA	2055	1000000000000	kg
67	USA	2056	1000000000000	kg
68	USA	2057	1000000000000	kg
69	USA	2058	1000000000000	kg
70	USA	2059	1000000000000	